the altitude of the planet, the relative situation of the planet and moon, with any other circumstances of twilight or haze that were likely to cause any incorrectness in the observation. To obviate the uncertainty that will always attend the results of such observations, from different states of weather, difference of telescopes, and imperfection of vision in different observers, Mr. Goldingham recommends not to draw any inference from comparison of corresponding immersions alone, without attending to the difference of corresponding emersions also, by which all sources of error will be in a great degree corrected.

Electro-Chemical Researches on the Decomposition of the Earths; with Observations on the Metals obtained from the alkaline Earths, and on the Amalgam procured from Ammonia. By Humphry Davy, *Esq. Sec.R.S. M.R.I.A.* Read June 30, 1808. [*Phil. Trans.* 1808, *p.* 333.]

In the last Bakerian lecture mention was made of an apparent decomposition of barytes and strontites into oxygen and inflammable matter.

In the prosecution of the same course of experiments upon lime and magnesia, similar results were obtained; for when either of these earths was slightly moistened with water, and thereby rendered a conductor of electricity from a powerful voltaic battery, inflammable matter was developed at the negative surface, and oxygen at the positive. And these phenomena were not dependent on the presence of water; for when the same earths were made conductors, by being in a state of fusion with boracic acid, analogous appearances were produced.

On account of the high inflammability of these bodies, similar experiments were conducted under naphtha, with the hope of preserving the products for examination; but although dark opake specks, having in some cases an appearance of metallic splendour, were produced, yet, when heat was applied to them under boiling naphtha, there was no appearance of fusion, and consequently no separation from the surrounding undecompounded earth; but when the mass was afterwards thrown into water, an effervescence occurred, and evident decomposition of the water.

A series of experiments were next undertaken upon mixtures of barytes or strontites, of lime or magnesia, of alumine or silex, with potash; and in the case of barytes and strontites, the potassium formed was evidently not pure, but apparently alloyed by another metallic substance.

When barytes, strontites, or lime, was mixed with oxide of silver or mercury, the compounds afforded analogous results when acted on by the voltaic battery.

When these experiments were resumed, after an interval of several weeks, a battery had been prepared with 520 pair of plates; and an attempt was then made to unite the bases of these earths with the

wire by which the power was conveyed from the negative end of the battery. Lead, silver, copper, and iron, were successively employed; and it was by means of the last that the most distinct results were obtained.

When an iron wire, one seventieth of an inch in diameter, was made the conductor on the negative side, and brought into contact with moistened barytes or strontites, lime or magnesia, alumine or silex, the globule formed by fusion at the end of the wire appeared in each case to be alloyed with something capable of acting upon water; but those last named had, in succession, less action than the preceding.

The author had not himself used mercury as a means of obtaining the bases in a state of alloy till informed by a letter from Professor Berzelius of Stockholm, who has used it with success for the decomposition of lime and barytes. And Mr. Davy has found it to succeed equally with strontites and magnesia. And although mercury alone failed of effecting the decomposition of alumine and silex, yet when an alloy of mercury and potassium was made the medium of communication even with these bodies, they each appeared to be decomposed by assistance of the affinity of potassium for their bases.

The author also informs us of his success in repeating an experiment of Professor Berzelius and Mr. Pontin, on the decomposition of ammonia: a globule of mercury being inserted in a small cavity made in a piece of carbonate or muriate of ammonia slightly moistened, they are placed together on a plate of platina positively electrified, and the wire from the negative end of the battery is applied to the mercury. The globule soon increases very considerably in bulk, and becomes converted into a soft amalgam, which absorbs oxygen from the atmosphere, or decomposes water into which it is thrown, and forms ammonia, while the globule gradually recovers its fluidity, and is reduced to its original size before the experiment.

The Croonian *Lecture. On the Functions of the Heart and Arteries. By* Thomas Young, *M.D. For. Sec. R.S.* Read November 10, 1808. [*Phil. Trans.* 1809, *p.* 1.]

Since the degree and manner in which the circulation of the blood depends upon the muscular and elastic powers of the heart and arteries are questions belonging to the most refined departments of hydraulics, the author has already submitted to the Society those general principles upon which he designs, in the present lecture, 1st, to inquire what would be the nature of the circulation if the vessels were as inelastic as glass or bone; 2ndly, in what manner the pulse would be transmitted if the tubes were merely elastic; 3rdly, what actions may be ascribed to their muscular coats; and, lastly, what disturbances are occasioned in different kinds of fevers and inflammations.

In order to determine the velocity of the blood in different parts, it is necessary to estimate the pressure by which it is urged forward, and the resistance opposed to its motion. From the experiments of